Christmas bauble as a tag

Christmas bauble

The flat Christmas bauble, decorated with an individual engraving or special Christmas wishes, is the ideal decoration for this year's Christmas tree.

The outer contour is milled and cut off on a turning machine with powered tools. A milling machine is used for face milling and engraving. The NC program was created on a CAD/CAM system. The engraving therefore consists of G1/G2/G3 blocks. The engraving section in the NC program can, however, easily be replaced by individual lettering if the SINUMERIK engraving cycle is used.

All information required for the reproduction, tool data and ShopTurn machining plan, NC program and drawings are summarized in the following sections.

www.siemens.com/cnc4you

Answers for industry.

SIEMENS

SIEMENS

Contents

1. Safety note

The handling of machines brings many dangers. Consequently, the legal and general company safety regulations must always be observed for the production of the Christmas bauble.

2. Preliminary remark

The following description is oriented to technicians familiar with CNC machines who have experience or knowledge of the SINUMERIK CNC. All technology data listed here is appropriate for the machines, tools, materials and machining plans used to produce the Christmas bauble. Although the wide range of conditions prevailing in other workshops mean they are only exemplary for a reproduction, in most cases they should allow a problem-free reproduction.

The programs were created and tested using a CNC turning machine (with counter spindle) equipped with SINUMERIK Operate V4.7 SP1 HF2 and a CNC milling machine equipped with SINUMERIK Operate V4.7 SP3. It should be possible to easily adapt the program to other SINUMERIK versions (e.g. different SINUMERIK Operate SW versions). A simulation and necessary changes (e.g. zero points) should always be carried out.

You can download all the CAD drawings, programs and machining descriptions for the workpieces free of charge at **www.siemens.com/cnc4you**.

The following files and formats are available there:
NC programs, drawings PDF, DXF data

Christmas bauble

www.siemens.com/cnc4you

3. Workpiece blanks/parts list

- AlCu4PbMg, round stock Ø 60 mm, length approximately 6 mm

4. Turning/milling machine and machining plans

- CNC turning machine DOOSAN PUMA 2600SY
  SINUMERIK 828D with SINUMERIK Operate V4.7 SP1

- CNC milling machine DMG MORI HSC 30 linear, SINUMERIK 840D sl - SINUMERIK Operate V4.7
  SP3

- NC programs

NC program	Designation
CHRISTMAS_BALL_TURN.MPF	Face turning and outer contour milling in the turning machine
CHRISTMAS_BALL_MILL.MPF	Engraving bells and lettering mill on the milling machine

Christmas bauble

5. Tools used

Turning, drilling and milling tools for machining the Christmas bauble.

Tools for turning machine

Tool name	Designation
SCHRUPP	Turning chisel for outside with one roughing disk, Roughing 80° SCLCL, CCGT120404
SCHL35	Turning chisel for outside with one finishing disk, Finishing 35° SVJCR, VBGT160404
CUTTER 3	Cutoff tool HM, plate width 3 mm, 273697-3
FRAESER_10	End mill Ø 10 mm
FR8	End mill Ø 8 mm
FASE-12	Chamfer cutter Ø 12mm, 90°
SPIBO 2.5	Twist Drill D2.5, 118°

Tools for milling machine

Tool name	Designation
SCHAFT_D10	End mill Ø 10 mm, two-side trimmer (Milling the jaws for the machine vice)
SCHAFT_D4	End mill Ø 10 mm, two-side trimmer (Milling the jaws for the machine vice)
Face milling	Cutter head or end mill for face milling of the Christmas bauble
KUG_D1	Ball Mill Engraving Ø 1 mm

6. Turning the part

The outer contour of the Christmas bauble is made on the turning machine.

The example program uses a part catcher. The program must therefore be adapted to the present machine.

.

Work steps at the turning machine

1. Approach the reference point of the machine.
2. Read-in the workplan: CHRISTMAS_BALL_TURN.MPF.
3. Read-in the tool list or zero offsets CHRISTMAS_BALL_TURN_TMZ.INI.
4. Measure tools and enter them in the tool list.
5. Insert tools in magazine.
6. Clamp the workpiece (clamping length 60 mm).
7. Set tool zero point, by scraping.
8. Program zero offsets.
9. Perform simulation.
10. Start production, process workplan.

After turning, the disc of the Christmas bauble is ready. The thickness is about 5 mm.

7. Milling the part

To mill the rear side, the Christmas bauble should be clamped using soft clamping jaws. To do so, the contour of the Christmas bauble has to be milled into the soft jaws. The milling contour should be slightly larger to avoid damage to the original contour during clamping.

In the example image, two workpieces are clamped simultaneously and processed one after the other.

When machining the back side, the workpiece is planed to a thickness of 2.5 mm. No NC program is supplied for this operation.

After milling the back side, the workpiece is anodized as desired. In the next step, the engraving is milled on the anodized workpiece.

Work steps at the milling machine

1. Approach the reference point of the machine.
2. Read-in the NC program: CHRISTMAS_BALL_MILL.MPF
3. Measure tools and enter them in the tool list.
4. Insert tools in magazine.
5. Clamp the workpiece.
6. Set tool zero point, by scraping.
7. Program of zero offsets.
8. Perform simulation.
9. Start production, process NC program.

Christmas bauble

8. Information on the Internet

Design of the parts, creation of the drawings, development of the work plans for the machining

TAC Technology and Application Center
Frauenauracher Str. 80
91056 Erlangen

Details of the tool machine and tools to be used

DOOSAN turning center
Internet: http://www.doosan.com/

DMG MORI High Speed Cutting Center
Internet: www.dmgmori.com

Manuals and information from the Siemens AG

Manuals and detailed information about our products, please visit the following websites:

- Documentation (https://support.industry.siemens.com/cs/ww/en/view/109476679)
- Service&Support Portal (www.support.industry.siemens.com)
- SINUMERIK Website (www.siemens.com/sinumerik)

Christmas bauble

9. Pictures

Simulation at the turning machine
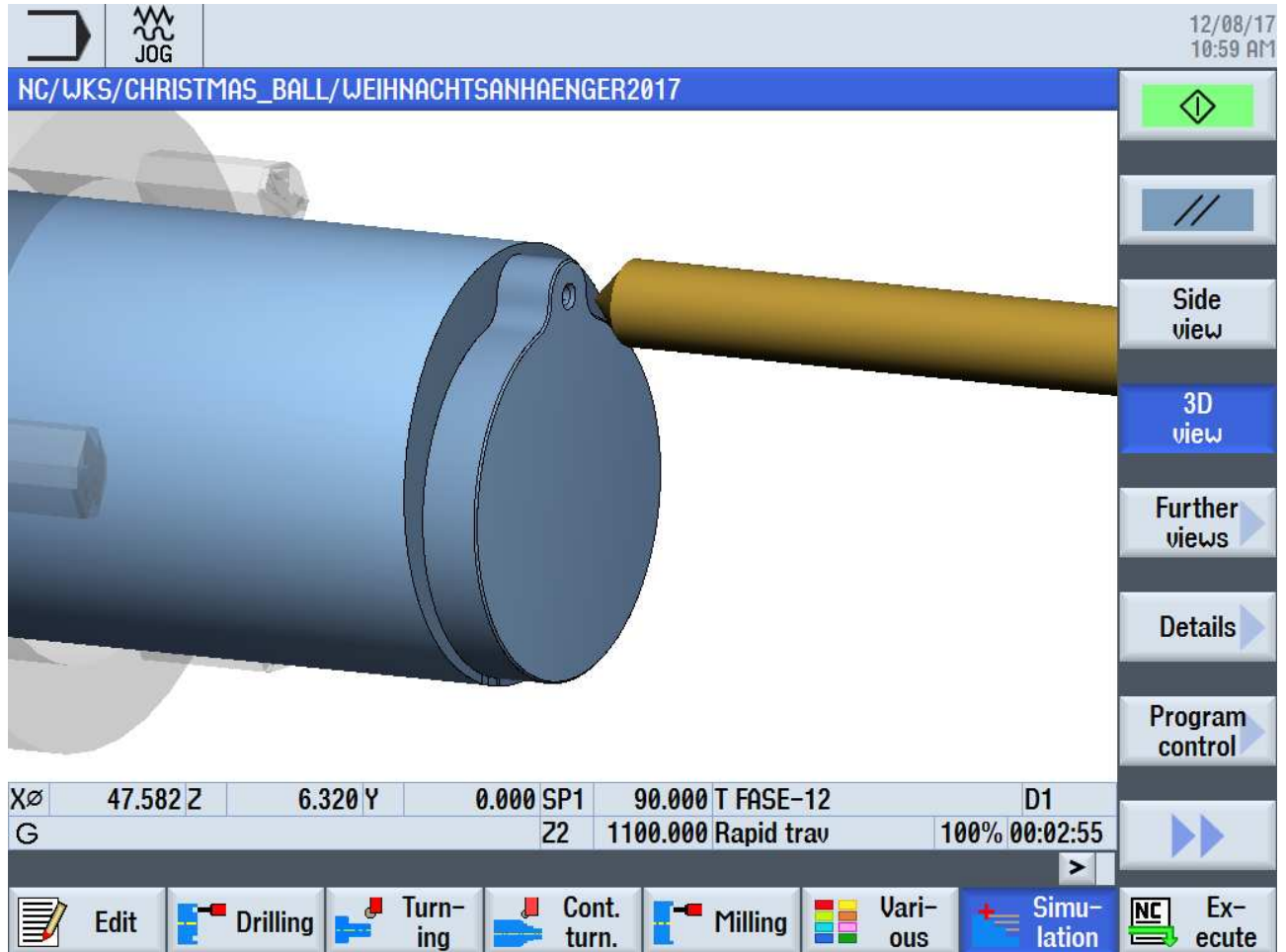
Contour editor
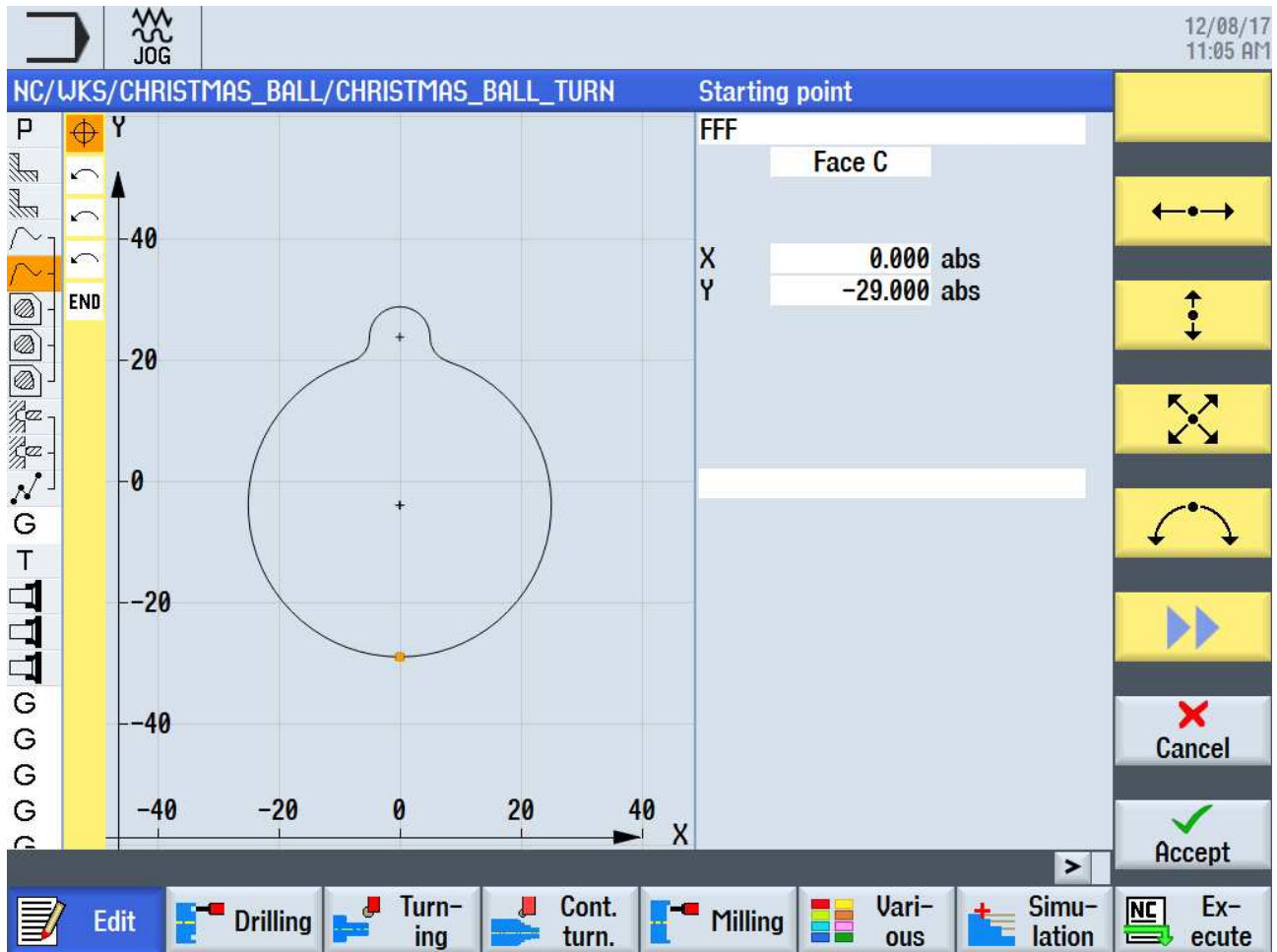
Christmas bauble
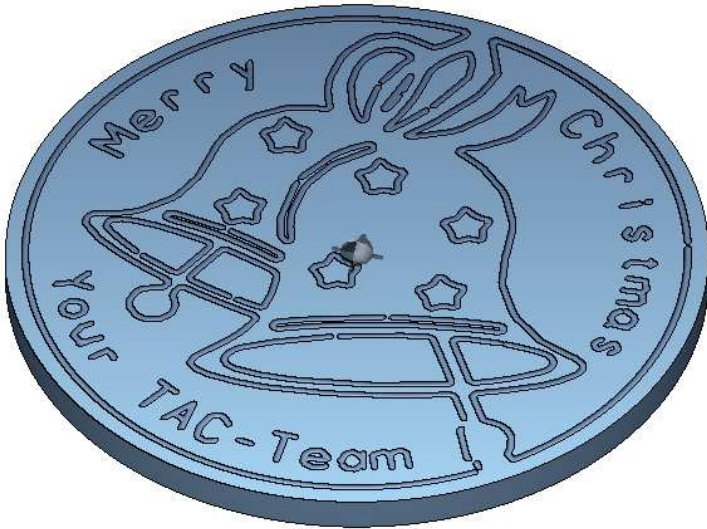
Engraving at the milling machine

SIEMENS   SINUMERIK OPERATE   12/15/17 9:28 AM   JOG

NC/WKS/CHRISTMAS/CHRISTMAS_BALL_MILL

Top view

3D view

Further views

Details

Program control

| X | 9.167 | Y | −19.767 | Z | 150.000 | A | | 0.000 | T KUG_D1 | | D1 |
| N51360 M30 | | | | | | C | | 0.000 | Rapid trav | 120% | 00:01:34 |

Edit | Drilling | Milling | Cont. mill. | | Vari-ous | Simu-lation | Ex-ecute

DXF file